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ABSTRACT

This report, based on a study of 60 gifted students from a vocational-technical high school, tested the influence of a gifted program on the career aspirations and career development of gifted vocational technical students. The program was based on Holland's theory of career development and Gottfredson's developmental theory of career aspirations. The program used the Focus On Model (based on the Enrichment Triad Model), which incorporates strategies of gifted and talented programming with the issues students face during career development. The model includes the following components: parental influence, gender roles, social orientation, and the development of a unique self. Students were provided with enrichment opportunities which expanded their exposure to various fields, developed their process skills, and involved them in creative productive investigations. Results of the program found significant heightened career aspirations for students who had participated in exploratory career and creative productivity activities. Recommendations are made for nurturing student potential, including: using a broadened conception of giftedness, using a broadened screening process, and integrating enrichment activities and career development. An appendix provides examples of enrichment activities. (Contains over 70 references.) (CR)

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Undiscovered Edisons: Fostering the Talents of Vocational-Technical Students

Lori A. Taylor
Jefferson County Public Schools
Louisville, Kentucky

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ABSTRACT

A developmental approach to examining career aspiration is holistic, intertwining the person and the environment. This approach focuses on the interplay between individuals and the environments and then looks at that relationship over time. Such an approach is necessary to understand career pathways of the gifted. Prior to 1980, career development theorists examined the individual in isolation from the environment. Gottfredson and others reformulated career development theory and drew attention to the interrelatedness and interdependence of the environment on career decisions. Gottfredson (1981) hypothesized, after reviewing the cognitive development literature that there are four basic stages of development: orientation to size and power (ages 3-5), orientation to sex roles (ages 6-8), orientation to social evaluation (about ages 9-13), and orientation to the internal, unique self (beginning at about age 14). She states that the major vocationally relevant elements of gender, social class background, intelligence, vocational interests, competencies, and values are incorporated into a vocational self-concept at different stages of development.

The literature on counseling the gifted and talented provides strategies for meeting the needs of the gifted, but does not include comprehensive programming models. Taylor (1993) integrated components from the Enrichment Triad Model (Renzulli, 1977; Renzulli & Reis, 1985) with a developmental approach to heightening career aspirations of gifted and talented students. The Enrichment Triad Model allows both the nurturing of creative productivity during school years as well as fostering the lifelong process of career development. The model also provides a broadened conception of giftedness for identifying students.

The Enrichment Triad Model was adapted to include an integrated career development model, Focus On (Taylor, 1993). This monograph proposes an implementation process that takes into account the needs of students as they travel through the stages of career development. Students are provided with enrichment opportunities which expands their exposure to various fields (modified Type I); process skills, including critical and creative thinking, specific methodological skills, and career development skills (modified Type II), and creative productive investigations (modified Type III) which can be used to explore potential career interests and allow students to see themselves in the role of practicing professionals and begin to visualize a different sense of self. In this study using the Focus On Model, significantly heightened career aspirations were found for students who had participated in creative productivity.

Undiscovered Edisons: Fostering the Talents of Vocational-Technical Students

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EXECUTIVE SUMMARY

In order to reach and nurture a broader spectrum of gifted and talented students, changes must be made in some of the practices currently being used. New approaches are needed for providing conceptual frameworks, identification processes, and implementation strategies for gifted and talented programs. Conceptions of giftedness must go beyond schoolhouse giftedness and include potentially creative productive behaviors. Broadened screening practices should be utilized which look for this potential creative productivity in a range of fields. Finally, creative productive behavior should be nurtured through activities which may influence a lifelong process of career development.

Career Aspirations: A Developmental Approach

Traditionally, career development theorists examined the individual in isolation from the environment. Gottfredson and others reformulated career development theory and drew attention to the interrelatedness and interdependence of the environment on career decisions. A developmental approach to examining career aspiration is holistic, intertwining the person and the environment. This approach focuses on the interplay between individuals and their environments and then looks at that relationship over time. From a developmental perspective, career aspiration is not a stable trait; it is a process that "unfolds" throughout the life span (Csikszentmihalyi & Robinson, 1986). As a person's concept of himself or herself and a future career image evolve internally, external environmental forces are thought to have differing effects at various times in the life span (Gottfredson, 1981).

Holland (1973) has suggested that vocational satisfaction, stability, and achievement depend on the match between one's personality style and the opportunities and rewards offered in the environment in which one interacts. He believes that people search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles.

Gottfredson (1981) has proposed a developmental theory of career aspiration. She hypothesized after reviewing the cognitive development literature that there are four basic stages of development: orientation to size and power (ages 3-5), orientation to sex roles (ages 6-8), orientation to social evaluation (about ages 9-13), and orientation to the internal, unique self (beginning at about age 14). She states that the major vocationally relevant elements of gender, social class background, intelligence, vocational interests, competencies, and values are incorporated into a vocational self-concept at different stages of development.

Career Development of Gifted and Talented Students

The literature on counseling the gifted and talented provides strategies for meeting the needs of the gifted, but does not include comprehensive programming models. Some research on the counseling needs of the gifted and talented has been documented in the literature (Fredrickson, 1979; Hoyt & Hebeler, 1974; Kerr, 1986; Kerr & Ghrist-Priebe, 1988; Perrone, 1991; Sanborn, 1979; VanTassel-Baska, 1989). Some of the recurring themes in this literature are multipotentiality that is, gifted students possess many potentialities and varied interests that may complicate their selection of a career, the large investment of time and energy for high level careers, and the needs for self-discovery, independence, and direct exploratory career experiences. The need for life/career counseling is also discussed in the literature on the social-emotional needs of the gifted. The approach that is usually recommended is a separate career counseling component that may consist of group seminars on selective topics, career nights, college visitations, internships in selected career areas, and clinical counseling on problem areas (VanTassel-Baska, 1989).

The Enrichment Triad Model allows a pathway to not only nurture creative productivity during school years, but to foster the process of lifelong career development. One of the major goals of the Triad Model is for students to discover through this general exploration (Type I enrichment) an area of interest where they can apply their talents to create a unique product (Type III enrichment). Research on students who have pursued creative productivity within a Triad Program has revealed significant increases in perceived characteristics such as study skills, work habits, positive feelings toward school and awareness of thought processes, personal strengths, and weaknesses (Starko, 1988). Studies reported that involvement in general enrichment activities and Type III projects allowed for career exploration (Delcourt, 1988), and affected students' career choices (Starko, 1988).

In the Focus On Model (Taylor, 1993), students are provided with enrichment opportunities which broaden their exposure to fields of endeavor (modified Type I); process skills, including critical and creative thinking, specific methodological skills, and career development skills (modified Type II); and modified Type III investigations. These opportunities can be used to explore potential career interests, experience the role of practicing professionals, and visualize a different sense of self.

The Focus On Model: Broadening Conceptions, Screening Processes, and Implementation

Broadening Conceptions of Giftedness: Creative Productivity

A broadened conception of giftedness is based on the premise that many who have achieved recognition because of their contributions to society have displayed an interplay of attributes (Reis & Renzulli, 1982; Renzulli, 1978). Hoyt (1965) reviewed 46 studies dealing with the relationship between traditional indicators of academic success and post-college performance and revealed that traditional indications of academic success have no more than a very modest correlation with various indicators of success in the adult world. These studies reinforce broadening the conception of giftedness from a sole reliance on test scores as an indicator of future potential.

Studies on the Secondary Enrichment Triad Model (Reis & Renzulli, 1985) and the elementary model, the Schoolwide Enrichment Model (Renzulli, 1977; Renzulli & Reis,

1985) have demonstrated that multiple cognitive and affective factors underlie the concept of creative productive giftedness (Delisle & Renzulli, 1982; Gubbins, 1982; Reis & Renzulli, 1985). In the model, giftedness is viewed as an interaction of above average ability, task commitment, and creativity brought to bear upon a specific performance area. These clusters of traits are known to interact with personality and environmental factors that can determine whether gifted behavior emerges (Delcourt, 1988; Schack, 1989; Starko, 1988). Burns (1990) found that although barriers to creative production do exist, proactive measures can be designed to counteract the personal or environmental factors. These barriers to success can also be identified as they affect the individual over time (Gottfredson, 1981).

Broadening the Screening Process

A broadened screening process is encouraged through the identification component of the Enrichment Triad Model, the Revolving Door Identification Model (Renzulli, Reis & Smith, 1981) and the Schoolwide Enrichment Model (Renzulli & Reis, 1985). Renzulli and Reis stress the importance of using multiple criteria in order to find those students who have the potential for gifted or creative productive behavior; those capable of an interplay between above average ability, creativity, and task commitment. The screening process should also take into account the stages that students pass through during career development, orientation to size and power, orientation to sex roles, orientation to social evaluation, and orientation to the internal, unique self.

Barron (1963) and MacKinnon (1965, 1978) completed the most extensive studies of highly creative individuals and found that they are characterized by such personality traits as inventiveness, independence, individuality, enthusiasm, determination, and industry. These are the types of characteristics that not only must be used in the screening process but must be nurtured in those individuals who show creative productive promise.

Implementation: Broadening Services

The Schoolwide Enrichment Model (Renzulli & Reis, 1985) provides a structural framework for meeting the needs of gifted and talented students at the elementary or middle school level. The resource teacher makes sure the needs of the students are met in the regular classroom, in classroom extension activities, and in activities that may originate in a resource room. Some enrichment activities may target a schoolwide population, some classrooms, and yet others may specifically target members of an identified talent pool.

The Secondary Enrichment Triad Model (Reis & Renzulli, 1985) was designed to meet the demands of providing services for gifted and talented students at the high school level. The model provides a framework for dealing with problems including scheduling, finding time for creative productive work in content oriented classes, and developing administrative and staff support.

Several kinds of services and three types of enrichment activities are included as the basis of the Secondary Enrichment Triad Model. One component of the model is a talent pool class which provides three types of enrichment activities: Type I, Type II, and Type III. The goal of the enrichment activities is to activate three interlocking clusters or attributes of giftedness that are necessary for creative productivity.

Focus On: An Integrative Model of Career Development

Gifted and talented programs could be modified to incorporate the processes of career development and to provide a broader spectrum of services. Activities that are very

similar to Renzulli's enrichment activities could be utilized with an orientation toward career exploration. These activities should also be recognized to affect students differently, taking into account their developmental levels.

Gifted programs provide services to children in all four stages of career development summarized by Gottfredson (1981). During stage one (ages 3-5), children orient to size and power, they begin to grasp the concept of being an adult. Programs that service preschool students could focus on orienting youngsters about what opportunities are available to them as adults. Elementary and middle school programs should reflect the importance of gender issues, the major focus of the second stage Gottfredson discusses, along with social orientation, prominent in stage three, as individuals begin to develop and narrow their career aspirations. High school programs must incorporate the struggle to define the unique self, her fourth stage, into the programming of services required at this stage of development. Finally, parental influence on career development is important (e.g., Frasier, 1987; McNair & Brown, 1983) and must become an integrated part of any program designed to nurture the untapped potential in underserved populations. The Focus On Model incorporates strategies of gifted and talented programming with the issues students face during career development. The stages of the model include focus on; parental influence, gender roles, social orientation, and the development of a unique self.

Research Results: Focus On Model

The study of the Focus On Model found significantly heightened career aspirations for students who had participated in creative productivity (Taylor, 1993). The importance of gifted and talented programming on career aspirations can be seen in a college application of a high school student who had been involved in the program. This student, who had completed a Type III investigation, wrote, "Being a part of the Gifted and Talented Program has expanded my knowledge of many different fields. It has given me many insights on different occupations, and has gotten me interested in becoming a lawyer."

Recommendations for Nurturing Potential

Recommendation One: Utilize a broadened conception of giftedness.

Discussion: Programs for gifted and talented individuals need to be developed around a broadened conception of giftedness. Programs that are developed around narrow conceptions serve narrow populations of students. Examples are programs that are developed to serve students in the top 3-5% on standardized intelligence tests, they will only reach a narrow segment of students with gifted and talented potential. An emphasis on creative productivity is often neglected in narrow conceptions of giftedness.

Recommendation Two: Utilize a broadened screening process.

Discussion: Screening needs to include the use of multiple criteria and to reflect the population being targeted for services. Standardized tests should only be a starting point in the screening process, and the tests should be chosen to reveal the strengths of the targeted population. Multiple criteria such as teacher nominations from behavioral rating scales, evidence of past creative productivity, and parent or peer nominations need to be part of the screening process.

Recommendation Three: Gifted and talented programs can affect the career aspirations of students if a developmental approach integrates enrichment activities and career development.

Discussion: Research has shown by grade 8, students have an adult-like awareness of gender roles, social class, and occupational prestige differences, and an understanding of the link between education, social class, and work. Career aspirations go through a developmental evolution based on parental influence, gender roles, social class roles, and the forming of one's unique personal identity based on specific interests and abilities. It has been shown that vocational identities can be influenced by involvement in gifted and talented programming that encourages creative productivity. Involvement in the creative productive process would allow an individual to reassess his or her vocational identity. The process brings together abilities, creative potential, and commitment to a problem that is of interest to an evolving internal self. Most importantly, students are allowed to view themselves in the role of practicing professionals and to visualize a different sense of self.

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Undiscovered Edisons: Fostering the Talents of Vocational-Technical Students

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Introduction

As a freshmen at a vocational-technical high school, Scott was considering going directly to work upon graduation. His thoughts of higher education were limited by aspirations. Although he had high academic abilities, he had not integrated them with his trade choice of electronics. Scott received services for four years in a gifted and talented program designed to provide him with developmentally appropriate opportunities that allowed him to pursue his interests and develop his potential by breaking down barriers to success. He attended general exploratory activities in which he experienced the world of research and design engineering. These activities were followed by group training in the process of inventing with a group of students that had expressed a desire to pursue their interests. Scott completed his first invention, an investigation of a real problem, as a sophomore with the help of a mentor from a local research and design engineering firm. A year later his second invention, at a higher level of sophistication, placed in the top one hundred of a national engineering competition. Through his involvement with the gifted program he received career counseling that included interest and personality inventories. By his senior year his interests, abilities, and career plans had meshed and he was accepted to a four year engineering program. He hopes to attend graduate school and have a career in research and design engineering.

Scott was part of a study that examined the effects of broadened gifted and talented services on the career aspirations of vocational-technical high school students. Just as Thomas Edison struggled with traditional schooling, many students with high potential are not found among the academically high achieving. Abilities and interests in spatially related, or kinesthetic areas often go unrecognized. Students of high potential who have barriers to success for any number of reasons, from learning style differences to low-income backgrounds need to be identified and provided with developmentally appropriate educational programs. These programs should be designed to allow them to explore areas of interest and to "try on" possible career pathways which encourage the development of creative productivity. The program that Scott participated in will be described in this monograph as well as an overview of the career development literature. Ideas will be shared on how to nurture the career potential and aspirations of a wider spectrum of gifted and talented students.

Career Aspirations: A Developmental Approach

Prior to 1980, career development theorists examined the individual in isolation from the environment. Gottfredson and others reformulated career development theory and drew attention to the interrelatedness and interdependence of the environment on career decision making and development (Fleming & Hollinger, 1994).

A developmental approach to examining career aspiration is holistic, intertwining the person and the environment. This approach focuses on the interplay between

individuals and their environments and then looks at that relationship over time. From a developmental perspective, career aspiration is not a stable trait, it is a process that "unfolds" throughout the life span (Csikszentmihalyi & Robinson, 1986). As a person's concept of himself and herself and a future career image evolve internally, external environmental forces are thought to have differing effects at different times in the life span (Gottfredson, 1981).

A recent longitudinal study of technical creative ability revealed the identification of factors that are necessary for adult creative technical performance and should be nurtured during childhood. Among these factors was the opportunity to try out and experiment with technological items in the environment; prior experience and technical expertise moderated the ability to creatively problem solve in the technical arena (Hany, 1994).

Other important career development variables that have been revealed through factor analysis of the most widely used career assessment instruments include career interest, the amount of knowledge one has about the world of work and important aspects of career decision making, extensiveness of involvement in career-planning activities, certainty of career interests, and decision-making style (Jepsen & Prediger, 1981). Gifted students have been found to have general knowledge relevant to career decision making, they know how many years of study a particular career may take, but needed to understand exactly what is done within these career environments and how to gain entry to specialized career paths (Kelly & Cobb, 1991)

Holland's Theory of Career Development

Holland's (1966, 1973, 1979, 1987) theory of personality style and career development describes different ways in which an individual can interact with his/her environment. He developed a type of measure of an individual's cognitive interaction with his/her environment and distinguishes those with styles that are adept at finding/solving problems. Holland (1973) has suggested that vocational satisfaction, stability, and achievement depend on the match between one's personality style and the opportunities and rewards offered in the environment in which one interacts. He believes that people search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles.

A key assumption of this theory is that behavior is determined by an interaction between one's personality style and the prevailing environmental characteristics. Holland proposes that an individual's personality style can be described by a profile of six interest areas: realistic, investigative, artistic, social, enterprising, and conventional. Occupational environments can also be grouped in terms of the same six areas as functions of the types of experiences, challenges, and opportunities they provide. Congruence refers to the match between an individual's preferences and personality style, and the opportunities and rewards offered by the environment. An individual with an investigative personality style would be best suited for a career in an investigative field, such as scientific research.

Holland's model is an important aspect of the *Strong-Campbell Vocational Inventory* which is often given to college students when they are making career decisions. This inventory has been used with gifted high school students and has potential as a powerful career counseling tool (Perrone, 1991). Kerr found that even a one day career guidance workshop could affect how female students reported personality styles as measured by Holland's test (Kerr, 1983). Positive changes in congruence, or the match between personality style and occupational choice, are known to occur when adolescents explore a variety of career alternatives and choose a career that matches their style (Grotevant, Cooper, & Kramer, 1986).

Gottfredson's Developmental Theory of Career Aspirations

Gottfredson (1981, 1986, Gottfredson & Becker 1981) has proposed a developmental theory of career aspiration. She hypothesized after reviewing the cognitive development literature that there are four basic stages of development: orientation to size and power (ages 3-5), orientation to sex roles (ages 6-8), orientation to social evaluation (about ages 9-13), and orientation to the internal, unique self (beginning at about age 14). She states that the major vocationally relevant elements of gender, social class background, intelligence, vocational interests, competencies, and values are incorporated into a vocational self-concept at different stages of development. Perrone (1991) argues for a fifth stage that would incorporate an integrated worldview and would occur in late adolescence or young adulthood.

The first stage of development summarized by Gottfredson, from her synthesis of the literature, is that of orientation to size and power (ages 3-5), begins when children grasp the concept of being an adult. They are considered to have intuitive thought processes at this stage, have not yet achieved object constancy, and are beginning to perceive the difference between themselves and others with respect to little versus big. Their occupational perceptions include occupations as adult roles. The orientation to sex roles occurs during the ages of 6 to 8. Thought processes during this period are concrete, objects are classified by simple groupings, and gender becomes a new element to perception of self and others. Gender becomes the new element in occupational perception and preferences.

Orientation to social valuation (ages 9-13) is accompanied by less concrete thought processes and two-factor groupings in classification. The new elements in perceptions of self and others include social class and intelligence. Prestige level appears in the occupational perception. In this stage the individual becomes sensitized to peer group evaluations and then to more general social expectations, values, and evaluations. The differences between children in their perceptions is believed to come from the emergence of class differences with respect to aspirations. Youngsters are found to identify with the socioeconomic group from which they come and to adopt those standards. Parents' aspirations for their children are reflected in what they consider acceptable career choices. The lower the social class of the mother, the lower the level of the position that would be acceptable to her (Dillard & Campbell, 1981; Rosen, 1959).

Parental influence has been found to be a factor affecting occupational aspirations along with socioeconomic status. Frasier (1987) states that the key ingredient in a family's orientation toward achievement is a supportive home environment, regardless of socioeconomic status. Parental encouragement of higher education was found to be the primary predictor of career aspirations for African American and White, male and female tenth graders (McNair & Brown, 1983). In this study socioeconomic status was found to have a greater negative impact on males than females. Ginzberg, Gusburg, Axeland, and Herma (1951) found that from a group of high ability, 11-year-old boys, only the boys from disadvantaged backgrounds did not plan on going on to college.

Differences in career aspirations between students of varying abilities occur at the same stage as socioeconomic factors. More able students were found to aspire to higher-level jobs, though the higher social class children had the higher aspirations within all ability groups (Sewell & Hauser, 1975; Sewell & Shah, 1968). Students of higher abilities and social class levels were more likely to actually plan to go to college whether encouraged or not. They are much more likely to aspire to college if they are encouraged. These complex links between education, social class, and work develop by grades 6 through 8.

Finally, in the last stage, an orientation to an internal, unique self occurs along with the shift to more abstract thought processes. The ability to process multi-factor groupings has developed. Personal interests, values, and competencies have evolved as elements in the perception of self and of others, and occupational perceptions now include field of work. In this fourth stage of development, youngsters seem to shift from accommodating directly from external socially defined goals to pursuing self-defined goals. The concern with external similarities of self with others has been replaced by a concern with one's unique capabilities. The shift toward a more unique and internally based definition of self is said to be accompanied by a shift toward inner direction and internal sources of self-knowledge. Adolescents are thought to be still dependent on adults for knowledge and direction, but they are beginning to seek independence. This time of transition is often accompanied by varying levels of high self-consciousness, unstable self-concepts, low self-esteem, and even depression. Rosenberg (1979) found that self-concept is often unsettled during junior high school and then stabilizes to some degree during high school. One study found that only 25% of high school students in grades 10 or 12 had reached the stage of development where the orientation to the internal, unique self occurs (Van den Daele, 1968). As Gottfredson states, this implies that students may have problems in coping with the developmental tasks that they face in high school and early in their careers.

Gottfredson's (1981) circumscription theory states that young children define themselves, sex roles, and occupations according to concrete, external, observable appearances, and behaviors. Vocationally relevant self-concepts are developed and incorporated in an order corresponding to their concrete and external visibility: first, gender identity, then social class, and finally feelings and values. "With age, youngsters develop more sophisticated and complex views of the world, relating many disparate pieces of information into more unified and coherent understandings of themselves and others" (p. 556). As children develop and incorporate new pieces of information into their view of self, they continue to redefine their occupational image. In each stage, new criteria are added to help them with their image: sex type of occupation, prestige level, and field of work. The youngsters are actually aware of the new dimensions in the stage preceding its incorporation. Children are aware of gender differences in stage one, but only in stage two are these differences associated with perceptions of both self and others. Henderson, Hesketh, and Tufflin (1988) directly tested this part of the theory and found that gender did influence occupational preferences at a younger age than social class. As the process evolves, preferences become more complex but more narrow. It is believed that movement between each stage includes the elimination of alternatives that are incompatible with adult occupations (rather than magical or nonhuman states of being), followed by sex type, prestige or difficulty, and finally particular interests and abilities.

Gottfredson's circumscription theory, just described, is based on the development of cognitive processes. Visible and concrete attributes, such as gender, are built into the self-concept and influence career preferences at an earlier stage than social class, interests, and values. Gottfredson's (1981) compromise theory predicts that elements internalized at an earlier age will be more resistant to change than those factors that are internalized later and emphasizes accordingly, the importance of gender and social status. A later study (Hesketh, Elmslie, & Kaldor, 1990) suggests that interest, the process of finding the unique self, is an important and complex factor. These researchers suggest the process is cumulative and that the final stage incorporates the input from all other stages, making interest, or orientation to the unique self of utmost importance. In this modification of Gottfredson's model, the importance of developing interests that may override decisions based singly on gender or social status is a key concept.

Research has shown by grade 8, students have an adult-like awareness of sex-roles, social class, and occupational prestige differences, and an understanding of the link

between education, social class, and work (Goldstein & Oldham, 1979). Youngsters from a higher social class have the higher aspirations (Sewell & Shah, 1968). Students were found, without intervention, not to vary significantly in their level of aspiration between grades 9 and 12 (Gottfredson & Becker, 1981). The early development of a vocational identity based on sex-roles, underestimation of ability, and social class roles can limit the range of later development of one's unique personal identity based on specific interests and abilities.

Career Development of Gifted and Talented Students

Sanborn (1979) believes that gifted and talented students often travel a developmental pathway of self-discovery. His years of work with gifted and talented students at the University of Wisconsin Research and Guidance Laboratory suggest that appropriate educational activities should be generated for the particular style and needs of the student. Programs should be designed to help these children learn about their own styles and abilities and to attempt to relate these qualities to opportunities open to them both in the present and in the future.

The literature on counseling the gifted and talented provides strategies for meeting the needs of the gifted, but does not include comprehensive programming models (Colson, Borman, & Nash 1978; Fredrickson, 1979; Hoyt & Hebeler, 1974; Kerr, 1983, 1986; Kerr & Colangelo, 1988; Kerr & Ghrist-Priebe, 1988; Perrone, 1991; Sanborn, 1979; VanTassel-Baska, 1989). One of the recurring themes in this literature is multipotentiality. The gifted possess many potentialities and varied interests that may complicate their selection of a career. The investment of time is another important issue since the gifted often look toward careers that will take a large investment of time and energy. The need for self-discovery and independence, along with the need for direct exploratory career experiences are also common issues.

In some of the literature on the social-emotional needs of the gifted, the need for life/career counseling is discussed. The approach that is usually recommended is a separate career counseling component that may consist of group seminars on selective topics, career nights, college visitations, internships in selected career areas, planning of annual courses of study, and clinical counseling on problem areas (VanTassel-Baska, 1989). VanTassel-Baska stresses the need for a partnership model, involving teachers, counselors, and parents. An example she uses involves a teacher in designing courses that utilize academic and career constructs. As part of the curriculum the course would involve speakers who represent key career areas to address certain topics. VanTassel-Baska suggests certain strategies for intervention of counseling needs such as the teaching of creative problem solving, encouraging positive and expressive outlets, and creating a "safe" environment to experiment with failure. Unfortunately, these constructs are not intertwined in her summary charts with the goals of career development. Existing programs for the gifted and talented do not actually intertwine academic enrichment activities with career exploration. Recognition of the importance of career development can be seen in aspects of the Purdue Secondary Model (Feldhusen & Reilly, 1983) and the Autonomous Learner Model (Betts & Knapp, 1980).

The Enrichment Triad Model

The Enrichment Triad Model allows us a pathway to nurture creative productivity during school years and to foster the process of lifelong career development. One major goal of the Triad Model is to have students discover through general exploration (Type I

enrichment), an area of interest where they can learn skills (Type II enrichment), and apply their talents to create a unique product (Type III enrichment). Research on students who have pursued creative productivity within a Triad Program has revealed significant increases in perceived characteristics such as study skills, work habits, positive feelings toward school, and awareness of thought processes, personal strengths, and weaknesses (Starko, 1988). Studies had reported that involvement in general enrichment activities and Type III projects allowed for career exploration (Delcourt, 1988), and affected students' career choice (Starko, 1988).

Components from the Secondary Enrichment Triad Model (Reis & Renzulli, 1985) and the elementary model, the Schoolwide Enrichment Model (Renzulli, 1977; Renzulli & Reis, 1985) have been integrated with a developmental approach to heightening career aspirations of gifted and talented students. In the Focus On Model (Taylor, 1993), students are provided with enrichment opportunities which broaden their exposure to various fields (modified Type I); process skills, including critical and creative thinking, specific methodological skills, and career development skills (modified Type II); and modified Type III investigations. These opportunities can be used to explore potential career interests, experience the role of practicing professionals, and visualize a different sense of self.

The Focus on Model: Broadening Conceptions, Screening Processes, and Implementation

Broadening Conceptions of Giftedness: Creative Productivity

A broadened conception of giftedness is based on the premise that many who have achieved recognition because of their contributions to society have displayed an interplay of attributes (Cox, 1926; Renzulli, 1978, 1986, 1988; Roe, 1952; Torrance, 1969; Wallach, 1976). Hoyt (1965) reviewed 46 studies dealing with the relationship between traditional indicators of academic success and post-college performance in the fields of business, teaching, engineering, medicine, scientific research, and other areas such as the ministry, journalism, and government. This extensive review revealed that traditional indications of academic success have no more than a very modest correlation with various indicators of success in the adult world. These studies reinforce broadening the conception of giftedness from a sole reliance on test-scores as an indicator of future potential.

Studies on the Secondary Enrichment Triad Model (Reis & Renzulli, 1985) and the Schoolwide Enrichment Model (Renzulli, 1977; Renzulli & Reis, 1985) have demonstrated that multiple cognitive and affective factors underlie the concept of creative productive giftedness (Delisle & Renzulli, 1982; Gubbins, 1982; Reis & Renzulli, 1985). In the model, giftedness is viewed as an interaction of above average ability, task commitment, and creativity brought to bear upon a specific performance area. These clusters of traits are known to interact with personality and environmental factors that can determine whether gifted behavior emerges (Delcourt, 1988; Schack, 1989; Starko, 1988). Burns (1990) found that although barriers to creative production do exist, proactive measures can be designed to counteract the personal or environmental factors. These barriers to success can also be identified as they affect the individual over time (Gottfredson, 1981). As described in the Focus On Model, the factors of parental influence, gender issues, social orientation, and self-concept all sequentially affect development and will determine if creative productive potential will be expressed (Taylor, 1993).

Barron (1963) and MacKinnon (1965, 1978) completed the most extensive studies of highly creative individuals and found that they are characterized by such personality traits as inventiveness, independence, individuality, enthusiasm, determination, and industry. Barron states that a special fascination for and involvement with the subject matter of one's field are the invariable precursors of original and distinctive work. These are the types of characteristics that must be nurtured in those individuals who show creative productive promise.

Broadening the Screening Process

The Enrichment Triad Model (Reis & Renzulli, 1985; Renzulli, 1977; Renzulli & Reis, 1985; Renzulli, Reis, & Smith, 1981) has at its core a screening process that recognizes a broadened definition of giftedness. The model nurtures the development of talents or gifts by utilizing a multifaceted screening process, providing opportunities designed to encourage exploration and skill building, and to ultimately stimulate creative production in a field of endeavor.

The Revolving Door Identification Model (Renzulli, Reis, & Smith, 1981), stresses the importance of using multiple criteria to find students who have the potential for creative productive behavior; those capable of an interplay above average ability, creativity, and task commitment. The process consists of obtaining four types of information about the student: psychometric, developmental, sociometric, and performance.

Psychometric data generally refer to tests of cognitive processes such as intelligence, aptitude, creativity, and school achievement. The type of tests that are used should take into account the characteristics of the population being tested. For example, a program that was targeting gifted students at a vocational-technical school utilized the spatial and mechanical intelligence scales on the *Differentiatal Aptitude Tests* (Taylor, 1993). Students from low-income environments do not fair well on standardized tests. Therefore, these students should be examined as a group and not compared against national norms.

Developmental information, knowledge about how the students interact with their environment, is suggested to be obtained from teacher rating scales, such as the *Scales for Rating the Behavioral Characteristics of Superior Students* (*SCRBSS*, Renzulli, Smith, White, Callahan, & Hartman, 1976). The *SCRBSS* consists of ten dimensions, each of which is named for the specific ability area it is designed to evaluate: Learning, Motivation, Creativity, Leadership, Art, Music, Dramatics, Communication (Precision), Communication (Expressiveness), and Planning. The first four scales are recommended for use in the nomination process. These scales have also been modified for use with students of low socioeconomic status (Baldwin, 1985). Other suggested sources of developmental information include ratings and biographical information from parents and student self-ratings or nominations. Developmental barriers to success should also be examined for possible impact on the screening process. For example, gender issues may begin to impact development in primary age students, and gender issues may begin to mask future potential. This underlies importance of using a variety of sources for screening data.

Sociometric information is defined as information about an individual that is provided by members of the peer group. Peer rating scales are available and can be used for this purpose. Performance information includes actual examples of creative production by the students. Anecdotal records, observational reports, performance evaluations, or rating scales can all be used to gather evidence of this component of the screening process. The growing use of portfolios in education provides an excellent resource for information. Actual student products from a variety of sources can be utilized in the screening process.

In establishing a talent pool of students who will be eligible to receive services, two basic criteria plus an alternative pathway approach is recommended (Renzulli, Reis, & Smith, 1981). A student who qualifies on either psychometric or developmental information would gain immediate access to services by automatically being placed in a talent pool. A student who is nominated by sociometric or performance criteria would have been considered for placement in the talent pool, pending a review by a selection committee.

Implementation: Broadening Services

Enrichment Triad Model

The Schoolwide Enrichment Model (Renzulli & Reis, 1985) provides a structural framework for meeting the needs of gifted and talented students at the elementary or middle school level. The resource teacher makes sure the needs of the students are met in the regular classroom, in classroom extension activities, and in activities that may originate in a resource room. Some enrichment activities may target a schoolwide population, some classrooms, and yet others may specifically target members of an identified talent pool.

The Secondary Enrichment Triad Model (Reis & Renzulli, 1985) was designed to meet the demands of providing services for gifted and talented students at the high school level. The model provides a framework for dealing with problems including scheduling, finding time for creative productive work in content oriented classes, and developing administrative and staff support. The services suggested in the model are blended into already existing options such as advanced placement, honors classes, and extracurricular activities. The formation of an Interdisciplinary Planning Team provides a mechanism for classroom and resource teachers to plan and organize program goals and activities. The team, including faculty members who volunteer to participate from each of the major academic areas, meets on a regular basis to discuss curriculum compacting options for students and to plan schoolwide enrichment opportunities.

The Secondary Triad Model involves the formation of talent pool classes which differ considerably from the traditional honors or accelerated classes. These classes are established as Triad Programs within any given subject. Classes include more intensive and individualized studies of the course content. The course content itself should be modified to reflect types of topics or areas of study not covered in the regular curriculum. All talent pool students receive an orientation to the program and are interviewed about interest in the talent pool classes. Even if eligible students do not enroll in talent pool classes, they can participate in enrichment activities and meet on a regular basis with the resource teacher for discussion, counseling, and any other intervention activity. Curriculum compacting allows for classroom time to be utilized for enrichment activities when the student has demonstrated mastery of required concepts.

Several kinds of services and three types of enrichment activities are included as the basis of the Secondary Enrichment Triad Model. One component of the model includes a talent pool class which provides three types of enrichment activities: Type I or general exploratory activities, Type II or group training activities, including investigative methodologies and process skills, and Type III or individual or small group investigations of real problems. The goal of the enrichment activities is to activate three interlocking clusters or attributes of giftedness that are necessary for creative productivity: above average ability, creativity, and task commitment.

Focus On: An Integrative Model of Career Development

Gifted and talented programs could be modified to incorporate the processes of career development (see Figure 1). Activities that are very similar to Renzulli's Type I (general exploratory), Type II (skill training), and Type III (opportunities for creative production) could be utilized with an orientation toward career exploration. These activities should also be recognized to affect students differently, taking into account their developmental levels.

Gifted programs provide services to children in all four stages of career development summarized by Gottfredson (1981). During stage one (ages 3-5), as children orient to size and power, they begin to grasp the concept of being an adult. Programs that service preschool students could focus on orienting youngsters about opportunities available to them as adults. Elementary and middle school programs should reflect the importance of gender issues, the major focus of the second stage Gottfredson discusses, along with social orientation, prominent in stage three, as individuals begin to develop and narrow their career aspirations. High school programs must incorporate the struggle to define the unique self, her fourth stage, into the programming of services required at this stage of development. Finally, the importance of parental influence on career development has been documented (Dillard & Campbell 1981; Frasier, 1987; McNair & Brown, 1983; Rosen, 1959) and must become an integrated part of any program designed to nurture the untapped potential in underserved populations. The Focus On Model incorporates strategies of gifted and talented programming with the issues students face during career development.

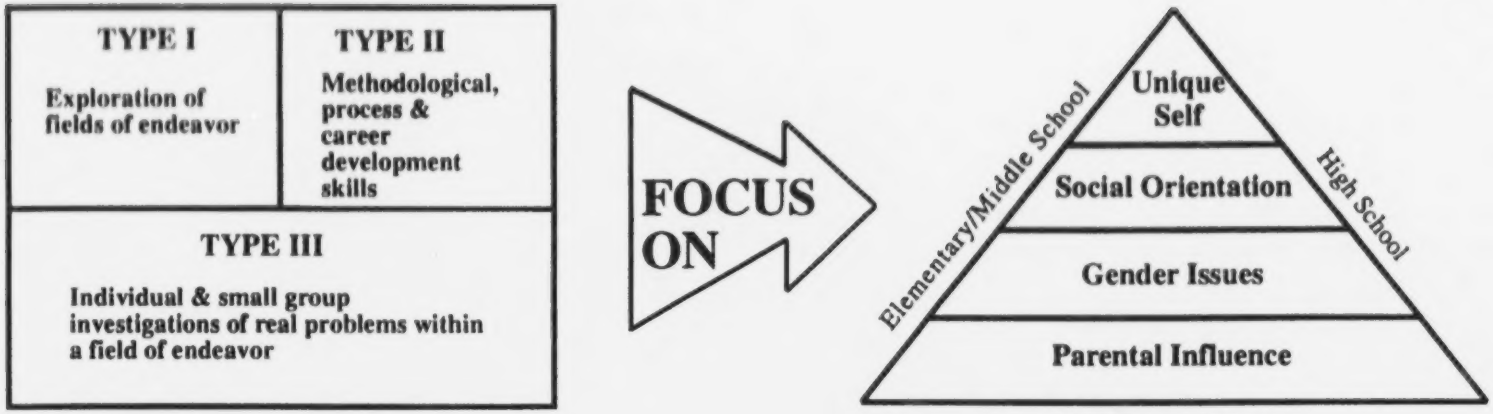
Focus on Parental Influence

Since parental influence has been found to be a major factor influencing occupational aspirations, parents need to be included in programming designed to meet the needs of gifted and talented students. Meetings should be held to include parents in the planning and implementation of a gifted program. They need to understand and recognize the need for them to encourage their child in the development of his/her giftedness and career aspirations. Delcourt (1988) has reported that parental behaviors important in nurturing creative productivity include encouragement of independence, risk taking behaviors, and experiencing the value and love of learning. Current research by Robinson (personal communication, 1991) describes a program that provides career guidance for parents of low socioeconomic students right in their homes. Parents need to be brought into the picture as schools strive to help a broader spectrum of students reach their full potential.

Focus on Gender Issues

The primary years, kindergarten through grade 3 or ages 6-8, encompass the stage where, according to career development theory, an orientation to sex roles occurs. Gender becomes a new element to perception of self and others in this stage. Type I exploratory activities should reflect the breadth of involvement of males and females in all fields of endeavor. The Type II skills would utilize critical and creative thinking skills and specific methodological skills associated with various career fields. Classroom integration of skills used in different fields could include units on the methodologies of architecture, engineering, and paleontology.

The Type III creative productive investigations would provide opportunities for students to realize that occupations exist to solve problems. These activities could build a base for an understanding that choosing an occupation means selecting problems that one is interested in working on. Type III training activities, modeling and training of the creative production process, would be important at these early stages of development.



Modified Enrichment Triad Model
(adapted from Renzulli, 1977)

L. A. Taylor, 1993

Figure 1. Focus On: An integrated model of career development

Focus on Social Orientation

Career development stage of orientation to social evaluation manifest itself during grades 4 and 5 (ages 9-13). The new elements in perceptions of self and others include social class and intelligence (Gottfredson, 1981). In this stage, the individual becomes very sensitized to peer group evaluations and then to more general social expectations, values, and evaluations. The origin of differences between children in their perceptions is believed to come from the emergence of class differences in aspirations (Ginzberg, Gubsburg, Axelrad, & Herma, 1951; McNair & Brown, 1983; Rosen, 1959; Sewell & Shah, 1968). Youngsters are found to identify with the socioeconomic group from which they come and to adopt those standards. Exploration of activities outside of those found in the immediate socioeconomic environment will be very important for some populations; therefore Type I activities should stress a breadth of activities.

Additional Type II skills should be recognized and considered in a developmental perspective. VanTassel-Baska (1989) lists strategies to address the needs that should be dealt with directly with students in this stage. An understanding of differences, between self and others can be handled through bibliotherapy, group discussions, and individual dialogues. The existence of learning styles and Holland's (1985) personality types could be springboards for discussions of the range of differences that exist in populations. An appreciation for their own individuality and the differences of others can be promoted through biographical study, recognizing and honoring diverse talents, and special seminars. Gowan (1979) strongly suggested a seminar type homeroom where high creative potential students could share unique interests in a safe environment to avoid the "herd instinct" that can prevent creative development at this stage. The Autonomous Learner Model has an individual development dimension which includes activities to develop learning skills, personal understanding, interpersonal skills, and career involvement (Betts & Knapp, 1980). However these skills are not integrated with the enrichment activities and the in-depth study dimensions of the model. Within the process of creative production, Type III level enrichment activities, powerful opportunities for career exploration and the raising of ceilings that may have been placed on students aspirations.

Focus on the Unique Self

During development, youngsters are found to shift from accommodating directly from external socially defined goals to pursuing self-defined internal goals (Gottfredson, 1981). The concern with external similarities of self with others has been replaced by a concern with one's unique capabilities. The shift toward a more unique and internally based definition of self is said to be accompanied by a shift toward inner direction and internal sources of self knowledge. This time of transition is often accompanied by varying levels of high self-consciousness, unstable self-concepts, low self-esteem, and even depression. Self-concept is often unsettled during junior high school and then stabilizes to some degree during high school. One study found that only 25% of high school students in grades 10 or 12 had reached the stage of development where the orientation to the internal, unique self occurs (Van den Daele, 1968). As Gottfredson states, this implies that students may have problems in coping with the developmental tasks that they face in high school and early in their careers. Self-concept development has been found to be positively affected by enrichment activities. Self-concept constructs such as the courage to be different were mentioned as being perceived as the most important benefit of gifted programs by students and parents (Moon & Feldhusen, 1994).

Type I activities at this stage should continue to broaden the fields of study that students encounter. Type II training skills, including critical and creative thinking, and specific methodological skills may take on new importance as students enter into more sophisticated stages of thinking. Type II skills, as they relate to career development or

career development skills, deserve much attention at this stage. As students orient toward a unique self they will need to gain a realistic assessment of their abilities, learn to harness critical and creative thinking abilities to make life decisions, and plan for their future. Self assessment procedures should be provided for the students by school personnel. Interest inventories such as the *Strong-Campbell*, and personality surveys such as *Myers-Briggs* can be used to help students focus on their own individual interests. Decision making and problem solving strategies can be applied to these real-life concerns.

Type III creative productive investigations are important to youngsters at this stage. It is important to provide opportunities that will leave students feeling competent in their explorations of particular fields of endeavor. Examples of modified Type I, Type II, and Type III enrichment activities from a high school program utilizing Focus On can be found in Appendix A. Bloom (1985), in his discussions of the development of talent, stresses the importance of the small successes that result in a child's increasing interest and greater commitment to a career field. The falling in love with a topic that often occurs during creative productivity can become intertwined with a future career image and predict future creative achievement (Torrance, 1981).

Type III investigations can be used to explore potential career interests, allow students to see themselves in the role of practicing professionals, and begin to visualize a different sense of self. This process is especially important for those who had limited their aspirations during development due to limits placed on sex-roles, underestimation of ability or confinements of social class. Involvement in the creative productive process would allow an individual to reassess his or her vocational identity. The process involves a bringing together of abilities, creative potential, and commitment to a problem that is of interest to an internal self. The nature of this "real" problem would then bring students in contact with the materials and methods used by professionals in many diverse fields. Students may develop a mentor relationship with a professional, making personal connections while exploring the field of interest.

The importance of gifted and talented programming on career aspirations can be seen in a college application of a high school student who had been involved in a program that utilized Focus On. This student, who had completed a Type III investigation, wrote, "Being a part of the Gifted and Talented Program has expanded my knowledge of many different fields. It has given me many insights on different occupations, and has gotten me interested in becoming a lawyer."

Research on the Focus On Model

The effectiveness of using the Focus On Model in heightening career aspirations was assessed. The following research question was posed:

> What are the effects of levels of enrichment in the Secondary Enrichment Triad Model and participation in a self-awareness and career focusing component on career aspiration?

Methods and Procedures

A mid-sized vocational-technical high school was selected as the site for this study because it met several criteria. The first of those criteria was that a gifted and talented program, based on the Secondary Enrichment Triad Model, had been in place for six years, four years with the same coordinator. A talent pool of 60 students was identified as having

the potential to exhibit gifted and talented behavior. The students were identified using procedures based on the Revolving Door Identification Model. The students received three types of enrichment, Type I (general exploratory), Type II (group training), and Type III (individual or small group investigation of real problems), as described in the Secondary Enrichment Triad Model (Reis & Renzulli, 1985) and Schoolwide Enrichment Model (Renzulli & Reis, 1985).

Another criteria met by this study site was that variability existed in the career aspirations of this gifted and talented population although the sample was both socioeconomically and ethnically homogeneous and was representative of the population in the school. The sample consisted of 7 females and 53 males. There were 59 students from White lower to middle class families, 1 from a African American middle class family.

Research Design

This research study used a posttest only control-group experimental type group design (Borg & Gall, 1989). Pretest information was gathered in order to assess group equivalence. Sixty subjects were randomly assigned to experimental (n=30) and control groups (n=30) that were involved in the career counseling component of the study. Random assignment was not used according to level of enrichment. The students chose the level of enrichment. The assignment of treatment and control groups was stratified randomly by level of enrichment to ensure equivalence. There were 14 subjects in the no enrichment group, 26 in the Type I group, and 20 in the Type III group. The cells of the experimental design were proportional.

Student records were used to determine the level of enrichment. Students were grouped for the 3 x 2 analysis of variance (ANOVA) by their level of enrichment: no enrichment (only identified), general exploratory enrichment (Type I), or creative production (Type III). They were grouped for analysis according to their participation (treatment) or non-participation (control) in the self-awareness and career focusing (SACF) counseling component. Students were placed in the Type III group if they had completed products during the last two years.

A pretest was administered to both groups, a questionnaire including one question from the *Student Descriptive Questionnaire* (College Entrance Examination Board, 1989). Both groups were administered the *Strong-Campbell Interest Inventory*, for assessment purposes and the *Myers-Briggs Type Indicator* for assessment purposes only. The treatment, explained below, was administered to the experimental group but not the control group. The same instrument was used as a pretest and posttest and was administered to both groups.

Treatment

Students in the treatment group participated in a self-awareness and career focusing (SACF) counseling component modeled after interventions planned at career laboratories for the gifted and talented at Texas A & M University (Colson, Borman, & Nash, 1978) and at the University of Iowa (Kerr, 1986; Kerr & Colangelo, 1988). The program involved assessment of the *Strong-Campbell Interest Inventory (SCII)* and the *Myers-Briggs Type Indicator (MBTI)* and an individual (50 minutes) counseling session. A school psychologist assessed the results of the instruments and provided the individual counseling sessions. The psychologist followed a structured interview schedule designed to clarify interests, needs, and values and to encourage goal setting behavior. The interview began with a career information sheet that was filled in by the student and provided information to the counselor on interests and aspirations. The Strong-Campbell

Interpretive report results were discussed: general occupation themes and basic interest scales along with a description of Holland's hexagon of themes. The occupations of people with similar interests to the students were reviewed. For example, a student with high Realistic, Conventional, and Investigative type scores would have similar interests to people in computer programming, engineering, and systems analysis. The *Myers-Briggs* results would then be discussed and relationship between Holland themes and *Myers-Briggs* types examined using explanation of types from manual (Myers & McCaully, 1985).

Students' original aspirations from the information sheet were discussed along with these results and cognitive ability results information from the *Differential Aptitude Tests*. On the basis of the test results, it was demonstrated to students how they were unique or special, and how these qualities could be related to career choices. Students were guided in setting appropriate career goals that reflected their abilities and their interests and encouraged to utilize school and community resources to reach their goals.

The *Strong-Campbell Interest Inventory* (*SCII*; Campbell & Hansen, 1985) is a commonly used career counseling tool for college students that has high validity and reliability measures (Pinkney, 1983). The instrument incorporates Holland's personality types with a wide range of occupational scales and determines congruent career options. The *Myers-Briggs Type Indicator (MBTI)* is often used along with *SCII* to provide an "excellent start for relating self-understanding to career planning" (Pinkney, 1983). The *MBTI* generates preference scores that describe a person's interactions on four dimensions. The integration of these two instruments is regarded as useful in encouraging active participation in the counseling process (Miller, 1988) and will potentially increase the individual's self-awareness, underlying decision making process, and the understanding of preferences scales (Pinkney, 1983).

A questionnaire included a question from the *College Board's Student Descriptive Questionnaire* (College Entrance Examination Board, 1989). The question on career aspiration determined how many years of further education or training the students were planning. The College Board studies on this questionnaire, and other studies using similar self-reported descriptive information have been shown to have high reliability scores ranging from 0.76 to 0.95 (Freeberg, 1988). Information from this instrument should be applicable to a number of educational purposes for which student biographical information has been used in the past (Freeberg, 1988). Other studies that have measured career aspiration have shown that expressed career plans have as high predictive validity as do measured interest (Bartling & Hood, 1981).

Results

Preliminary Analysis

The data were initially examined to determine if the underlying assumptions of analysis of variance (ANOVA) were met. These included the examination of the distribution of the sample variances to determine if they were significantly different. The means and the variance between the control and treatment groups of the pretest on the number of years of college planned did not significantly differ. The pretest mean for the control group was 3.5, the standard deviation 2.2. The pretest mean for the treatment group was 2.9, and the standard deviation 1.9. To examine another underlying assumption of ANOVA, the distribution of the sample was checked for normality. A univariate analysis was conducted on the dependent variable, career aspiration. The curve was found to be positively skewed and the data were transformed logarithmically.

ANOVA Analysis

The results of the Analysis of Variance (ANOVA) determining the effects of the levels of enrichment experienced in the talent pool classes and participation in a self-awareness and career focusing component are found in Table 1.

The first main effect concerns the participation in a career counseling component (SACF) in addition to Triad enrichment and its effects on career aspiration. As can be seen in Table 1, the analysis of variance on these data revealed no significant difference between participation in a career counseling component (SACF) with respect to career aspiration.

There is a significant difference, a main effect, F (2,54) = 7.784, $p<.001$, MS=0.457 between the levels of enrichment in the Secondary Enrichment Triad Model with respect to career aspiration. The students who did not decide to pursue enrichment opportunities had a mean of 1.5 years of college planned. Those who participated in Type I, general exploratory activities had a mean of 2.6 years of college to which they were aspiring. The students who had completed investigations of real problems, Type III activities, had a mean of 4.0 years of college planned. Therefore, students who had participated in the enrichment activities had more years of college planned.

The question of a significant interaction of the levels of enrichment in the Secondary Enrichment Triad Model and participation in a self-awareness and career focusing component (SACF) on career aspiration was analyzed. As can be seen in Table 1, no significant interaction was found between the levels of enrichment in the Secondary Enrichment Triad Model and participation in a self-awareness and career focusing component (SACF) on career aspiration.

Table 1.

Results of 3 x 2 Analysis of Variance

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
SACF	0.011	1	0.011	0.190	0.665
LEVELS	0.915	2	0.457	7.784	0.001*
SACF X LEVELS	0.123	2	0.061	1.044	0.359
Error	54 3.173				

* $p < .001$

Post Hoc Analysis

A Tukey Post hoc analysis was conducted in order to determine where the significant differences existed between levels. As seen in Table 2, significant differences were found between no enrichment and Type III, and Type I and Type III. The Q value reported for the levels, no enrichment and Type III was 5.78 and was significant at the $p<.01$ level. The Q value determined between the levels Type I and Type III was 6.08 and was significant at the $p<.01$ level. There were no significant differences, a Q value of 2.48, found between providing no enrichment and providing Type I enrichment experiences. Therefore, the Type III enrichment activities that are significantly related to the career aspirations of the students in this study.

Discussion

The Focus On Model significantly heightened career aspirations of high school students who had participated in exploratory activities and creative productivity. The students participated in enrichment activities in such fields as cultural arts, computer arts, engineering, environmental science, and architectural design (see Table 3). Standard career development types of activities such as familiarization, exploration, and preparation were intertwined with the enrichment activities of the gifted and talented program. Although the exploratory activities did heighten career aspirations as measured in the number of years of college planned, it was the involvement as a creative productive "practicing professional" that had the greatest impact on the students.

Table 2.

Results of Post Hoc Analysis Using Tukey Method

Levels	Means	Q values#
0	1.5	
1	2.6	2.48 (0 & 1)
3	4.0	5.78* (0 & 3) 6.08* (1 & 3)

* $p < .01$

Q values obtained using logarithmically transformed data

Table 3.

Description of Type I and Type III Activities

Student	Type I	Type III - Enrichment Activity		
	Area	Topic	Product	Audience
1	c, a, en	writing	poetry	publication
2	c, en, eg	environment	Earth Day	school/community
3	c, en, eg	environment	Earth Day	school/community
4	c, a, en, eg	environment	Earth Day	school/community
5	c, eg	engineering	invention	competitions
6	c, eg	engineering	invention	patent attorney
7	c, eg	engineering	invention	competitions
8	c, g	politics	speech	U.S. Congress
9	c, ar	architecture	model	school, museum
10	c, a, g	advertising	commercial	radio producer
11	c, a, ar	architecture	home design	architects
12	c, a, ar	architecture	home design	architects
13	c, a, ar	design	commercial	business
14	c, a, eg	computer/art	design	school
15	c, eg	advertising	commercial	radio producer
16	c, a, eg	advertising	commercial	radio producer
17	c, a, eg	drawing	design	art college
18	c, a, eg	advertising	commercial	radio producer
19	c, eg	engineering	invention	competitions
20	c, a, eg	computer	music	community

c=cultural, a=arts, eg=engineering, en=environmental, g=general, ar=architectural

This study examined the effects of the Schoolwide Enrichment Model (Renzulli, 1977; Renzulli & Reis, 1985) integrated with a career development component, Focus On (Taylor, 1993). The Enrichment Triad Model allows a pathway to not only nurture creative productivity during school years, but to foster the process of lifelong career development by engaging students as active participants in a real-world oriented learning process. Explorations were offered in many fields of endeavor and there were opportunities to interact with and simulate professional levels of study.

The results support the developmental theory of career aspiration proposed by Gottfredson (1981). She hypothesized after reviewing the cognitive development literature that there are four basic stages of development: orientation to size and power (ages 3-5),

orientation to sex roles (ages 6-8), orientation to social evaluation (about ages 9-13), and orientation to the internal, unique self (beginning at about age 14). The vocationally relevant elements of gender, social class background, intelligence, vocational interests, competencies, and values were thought to be incorporated into a vocational self-concept at different stages of development. We would expect a successful intervention to be able to remove barriers due to gender in the primary grades.

The subjects from the vocational-technical high school and identified as members of a talent pool who did not opt for enrichment opportunities had a mean of 1.5 years of college planned. Students who participated in Type I, general exploratory experiences, had a mean of 2.6 years of college aspirations. The students who had completed investigations of real problems, Type III experiences, had significantly heightened career aspirations, they had a mean of 4.0 years of college planned. The career development of students involved in this study was intertwined with the development of their creative productivity. Possible explanations of this relationship may be found in Gottfredson's theory of career development. According to Gottfredson (1981), all students pass through a developmental career pathway. The important objectives of the later stages of career development, such as those involving high school students, are to orient towards the internal, unique self. One of the major goals of the Triad Model is for students to discover through general exploration (Type I enrichment) an area of intense self interest. It is not surprising then that a connection was found between involvement in creative productivity and heightened career aspirations. Involvement in the creative productive process would allow an individual to reassess his or her vocational identity. The process brings together abilities, creative potential, and commitment to a problem that is of interest to an internal self. The nature of this "real" problem would then put students in contact with the materials and methods used by professionals in many diverse fields. Students may develop a mentor relationship with a professional, making personal connections while exploring the field of interest. Most importantly, students are allowed to view themselves in the role of practicing professionals and begin to visualize a different sense of self. This process would be especially important for those who had limited their aspirations during development due to constraints placed on sex-roles, underestimation of ability, or confinements of social class.

Although this study has been conducted on a small scale, the results are encouraging when considering the career development of special populations. Aspirations can be heightened of students who have experienced early constraints on gender roles and social class. Dreams that have been narrowed in scope, can again be broadened through programming that is responsive to the developmental processes occurring when those dreams are being spun.

Conclusions

Potential exists in youth from every socioeconomic group for participating in a range of career fields, and for solving the societal problems that will arise. Studies have shown that students from lower socioeconomic families often underestimate their potential in a chosen career field (Ginzberg et al., 1951; McNair & Brown, 1983; Rosen, 1959; Sewell & Shah, 1968). There is a ceiling created by societal expectations, placed upon the educational potential of these students.

Research has shown by grade eight, students have an adult-like awareness of sex-roles, social class and occupational prestige differences, and an understanding of the link between education, social class, and work (Gottfredson, 1981, 1986). The early development of a vocational identity based on sex-roles, underestimation of ability, and

social class roles can limit the range of later development of one's unique personal identity based on specific interests and abilities.

With intervention, vocational identities can be influenced by involvement in gifted and talented programming. Focus On, an integrative model of career development, allows students to explore a full range of opportunities, developing interests and aspirations that can prevent environmental factors from narrowing their options. Thomas Edison in discussing the intervention of home schooling that his mother provided for him after only three months of formal schooling related:

> The good effects of her early training I can never lose. If it had not been for her appreciation and her faith in me at a critical time in my experience, I should very likely never have become an inventor. You see, she believed that many of the boys who turned out badly by the time they grew to manhood would have become valuable citizens if they had been handled in the right way when they were young. Her years of experience as a school teacher taught her many things about human nature and especially about boys. I was always a careless boy, and with a mother of a different character I should have probable turned out badly. (Gudeman, 1984, p. 53)

Recommendations for Nurturing Potential

Recommendation One: Utilize a broadened conception of giftedness.

Discussion: Programs for gifted and talented individuals need to be developed around a broadened conception of giftedness. Programs that are developed around narrow conceptions serve narrow populations of students. Examples are programs that are developed to serve students in the top 3-5% on standardized intelligence tests. They will only reach a narrow segment of students with gifted and talented potential. An emphasis on creative productivity is often neglected in narrow conceptions of giftedness.

Recommendation Two: Utilize a broadened screening process.

Discussion: Screening needs to include the use of multiple criteria and to reflect the population being targeted for services. Standardized tests should only be a starting point in the screening process, and the tests should be chosen to reveal the strengths of the targeted population. Multiple criteria such as teacher nominations from behavioral rating scales, evidence of past creative productivity, and parent or peer nominations need to be part of the screening process.

Recommendation Three: Gifted and talented programs can affect the career aspirations of students if a developmental approach integrates enrichment activities and career development.

Discussion: Research has shown by grade 8, students have an adult-like awareness of gender roles, social class, and occupational prestige differences, and an understanding of the link between education, social class, and work. Career aspirations go through a developmental evolution based on parental influence, gender roles, social class roles, and the forming of one's unique personal identity based on specific interests and abilities. It has been shown that vocational identities can be influenced by involvement in gifted and talented programming that encourages creative productivity. Involvement in the creative productive process would allow an individual to reassess his or her vocational identity.

The process brings together abilities, creative potential, and commitment to a problem that is of interest to an evolving internal self. Most importantly, students are allowed to view themselves in the role of practicing professionals and to visualize a different sense of self.

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Appendix A

Examples of Type I, Type II, and Type III Enrichment Activities

TYPE I Activities: General Exploratory Activities

Career oriented activities

Explorations in **Engineering**, an interactive demonstration of the principles of engineering at a university engineering department.

Art and Architecture, hands-on involvement in explorations at a graphic design studio and an architectural firm.

Research and Design in Electronics, a demonstration and discussion of future directions in engineering at an electronics firm.

Robotics, an introductory investigative laboratory.

A visual presentation and introduction to **Video Graphics** on site.

Lecture and discussion on **Careers in Environmental Engineering**.

The workings of the **Stock Market**, lecture/discussion by a broker.

Workshop by a cartoonist, **Political Cartooning**.

Earth Day, a full day of activities promoting **Environmental Awareness**.

Tropical Deforestation, effects on our environment, **Environmental Studies**.

TYPE II Activities: Group Training Activities

CoRT Thinking Skills Program, Critical and Creative **Thinking Skills** Curriculum in ninth, tenth, eleventh, and twelfth grade talent pool classes.

Self assessment procedures were provided for the students by school personnel. An interest inventory, the *Strong-Campbell*, and personality survey, *Myers-Briggs*, were used to help students focus on their own individual interests. *P-SAT*, *SAT*, college applications, and college selection computer programs all discussed and processes monitored along with school guidance personnel.

Technical Creative Invention Workshop, six workshops on the creative process and inventing.

Graphic Design, computer applications.

Robotics Workshop, programming the computer.

Design an Ad Competition, workshop with art instructor on fundamentals of **Advertising**.

Student presents an **Environmental Awareness** Workshop at local high school.

Students present workshops on their career interests at intermediate school's **Career Day**.

TYPE III Activities: Individual or Small Group Investigations of Real Problems

Engineering. Several students completed electronic design projects after completing the Invention/Creativity Workshops. A student entered his electronic design ideas into the McGraw Edison Competition. Three other students met with engineers at an electronic firm and eventually completed building their inventions. They had the opportunity to enter them in the Duracell Battery Competition, an Invention Convention, and the State Science Fair. One student placed third honors in the State Science Fair. Another student entered his design into a National Engineering Competition and placed in the top 100 nationally. This student then went on to finish his prototype and place second honors at the State Science Fair and first place at Invention Convention. He had been in contact with several patent firms and investigated the patenting process. An engineering seminar series was attended by several students at a university during the school year and one student attended a summer institute in Michigan for young women interested in engineering.

Environmental Studies. After attending several Type I activities on this topic, a group of students began a **Recycling Project**. They developed an awareness campaign which included flyers and a showcase demonstration. They started a weekly recycling drive in the school. The group managed to collect over 1200 pounds of paper for several months. Participation by the faculty was very high. One student, the chairperson of the group, spent several months planning a schoolwide **Earth Day 1990**, a celebration of the 20th Anniversary of the start of environmental movement. He lined up speakers for the event that included the Mayor, a State Senator, a biologist from a Nature Center, and a representative from the State Department of Environmental Protection. He obtained funding to sponsor nationally known folk musicians and a schoolwide tree planting. This student received a citation from the State Senate to acknowledge his efforts. He has shared his experiences with several interested groups including students at a local high school.

Architectural Design. With the help of an architect the group learned the fundamentals of passive solar design, and critiqued and worked on several revisions of passive solar design plans. The plans were entered into state and regional competitions and were displayed within the school showcase. Plans were made to build a small working scale model.

Computer/Art. A student became interested in art applications and the use of the computer. He was granted an internship during the summer at a video production firm. Concepts learned were applied to a computer/art project.

Advertising. Students attended several workshops presented by a radio producer on advertising and radio. They wrote, performed, and produced a radio commercial at the cable television station using professional equipment. The commercial was entered into a radio competition for potential broadcast.

Writing. A student wrote a series of poems that were critiqued by an English teacher. The student has read about and attended workshops on poetry. His works were published by a local high school literary publication. He is currently attending college and majoring in English.

Wood Design. Interest in carousels led this student to plan a trip for his class to a carousel museum. He met with craftspeople at the museum who encouraged him to begin a scale model carousel design. When construction is completed, the model may be kept on exhibit.

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